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Cloud-Based Payroll and Attendance Management System

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ABSTRACT: Managing workforce data, tracking attendance, and processing payroll manually is highly prone to human error and administrative bottlenecks. This paper presents an automated, cloud-based Payroll Management System designed to streamline organizational HR workflows. The system features separate, secure administrative and employee portals hosted on the cloud. The administrator panel facilitates employee onboarding, credential generation, real-time attendance auditing, leave approval, and automated payslip generation. The employee portal enables workers to securely log in, monitor personal schedules, apply for leaves, track overtime calculations, and download generated payslips. Developed using HTML, CSS, JavaScript, and Bootstrap for the frontend, Nginx as the web server, PHP for server-side business logic, and MySQL for relational data persistence, the entire architecture is deployed on an Amazon Web Services (AWS) EC2 instance to ensure high availability, scalability, and secure accessibility.

KEYWORDS: Payroll Processing, Cloud Computing (AWS EC2), Nginx, PHP MySQL, Leave Management, Attendance Tracking.

I. INTRODUCTION

Human resource asset management represents a foundational cornerstone for administrative operations within any corporate or institutional enterprise. Traditional operational paradigms relying heavily on ledger books or disparate desktop spreadsheets to track employee clock-ins, leave allowances, overtime records, and salary distributions frequently suffer from data redundancy, mathematical miscalculations, and security vulnerabilities. To address these vulnerabilities, transitioning workflows toward unified web-based architectures has become essential.

This paper introduces a robust **Cloud-Based Payroll and Attendance Management System**. The primary objective is to create a secure, dual-access dashboard web application that bridges the gap between administrative oversight and employee self-service. The system automates tedious operations such as calculating net payable salaries based on complex parameters—including full days worked, half days, approved leaves, weekly off-periods, and accrued overtime hours.

The technical architecture utilizes a lightweight yet high-performance **Nginx** web server configured to serve a responsive **HTML5/CSS3/JavaScript** frontend. Dynamic data processing and core business logic are executed using **PHP**, interfacing with a structured **MySQL** relational database schema. To guarantee enterprise-grade accessibility, reliability, and security, the system is fully deployed on an **Amazon Web Services (AWS) Elastic Compute Cloud (EC2)** infrastructure.

The remainder of this paper is organized as follows: Section II reviews related literature and existing work. Section III explains the architectural methodology and database entity relationships. Section IV breaks down the experimental framework and operational modules. Finally, Section V concludes the research work and presents future expansions.

II. RELATED WORK

Automated enterprise resource planning (ERP) frameworks have evolved significantly over the past two decades. Early web-hosted systems relied heavily on traditional monolithic architectures, which often struggled with real-time computations and secure cross-network access.

Recent paradigms heavily utilize secure cloud platforms. Authors in [1] emphasized that transitioning local database services to scalable cloud infrastructures like AWS dramatically reduces local maintenance overhead while providing 99.9% uptime. Research in [2] demonstrated that utilizing an Nginx web server web infrastructure yields a significantly lower memory footprint and superior concurrent connection handling compared to legacy Apache setups when executing heavy server-side PHP scripts.

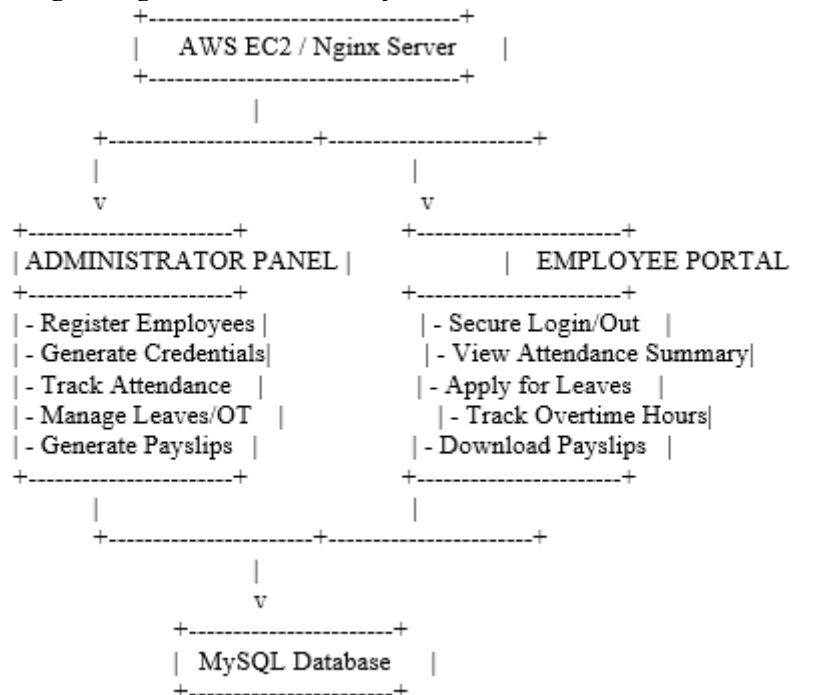
In terms of attendance and payroll tracking, various logical filters must be applied. Connective computation parameters for matching date-to-date summaries were explored in [3], demonstrating how dynamic algorithmic filters help eliminate manual processing errors. Authors in [4] evaluated employee self-service portals, concluding that allowing workers to independently download cryptographically generated or system-verified PDF payslips minimizes HR department workloads by up to 60%. This project builds upon these concepts by integrating comprehensive text-filtered attendance logs, flexible leave balances, and dynamic overtime calculations into a singular, cost-efficient cloud environment.

The system presented in this paper is divided into two distinct operational panels:

1. **The Administrator Dashboard:** Handles backend control, structural logic rules, and database CRUD (Create, Read, Update, Delete) tasks.
2. **The Employee Self-Service Dashboard:** Handles front-end user actions and individual data access requests.

III. METHODOLOGY

The system's structural flow relies on a clear separation of privileges between administrators and employees. The application's operational logic is organized into several key modules:



1. Administrative Workflow & Backend Logic

When an administrator registers a new worker, the system automatically generates unique, encrypted login credentials. The administrator retains complete visibility over all personal and professional employee records. The system applies explicit logical conditions to calculate payroll inputs:

$$\text{Total Payable Days} = \text{Full Days} + (0.5 \times \text{Half Days}) + \text{Paid Leaves}$$

$$\text{Net Salary} = (\text{Total Payable Days} \times \text{Daily Wage Rate}) + (\text{Overtime Hours} \times \text{OT Rate}) - \text{Deductions}$$

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2. Employee Dashboard & Summary Filtering

Employees authenticate via a secure login interface session. The system features an interactive Date-Filter module (FROM [Date] TO [Date]). When a query is executed, the backend triggers structured SQL queries to retrieve a comprehensive workspace summary.

This summary cleanly breaks down total active days, half-days worked, full days, remaining leave balances, designated weekly days off, and accumulated overtime hours. The system automatically converts these verified database records into a clean, downloadable PDF payslip format.

IV. EXPERIMENTAL RESULTS

The operational stability of the application was evaluated across multiple user roles on the AWS EC2 instance. The interface screens display accurate calculations and smooth transitions between panels.

- **Registration and Portal Separation:** Admin-side user creation successfully creates a corresponding entry in the MySQL user table, assigning appropriate role privileges (role_id = 1 for Admin, role_id = 2 for Employee).
- **Dynamic Attendance Summaries:** Testing the date-range filtering module demonstrated stable performance. For example, selecting a range from 01-05-2026 to 15-05-2026 correctly calculated and displayed the following user logs:

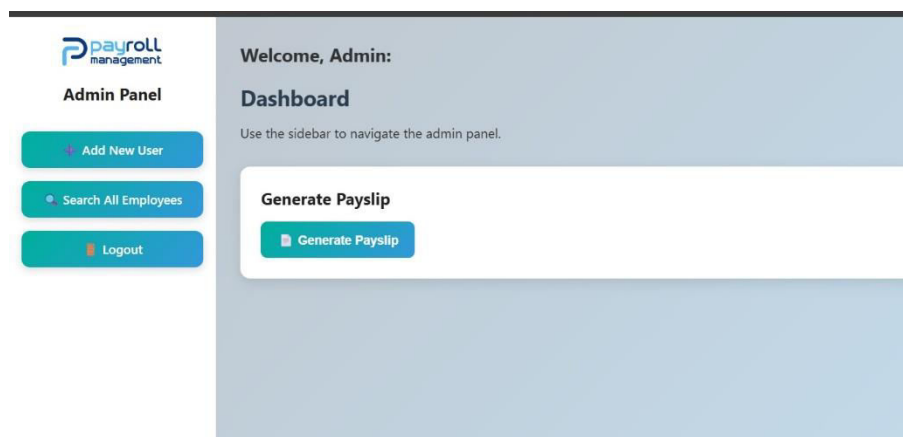
Metric Type	Logged Metrics Summary Value
Total Calendar Period Days	15 Days
Full-Time Present Days	10 Days
Half-Day Intervals	2 Sessions (Equivalent to 1 Full Day)
Approved Balanced Leaves	1 Day
Weekly Days Off Scheduled	2 Days
Accumulated Overtime Hours	8.5 Hours

- **Payslip Generation and Export:** Once the administrator verifies the data and clicks "Generate Payslip," the server compiles the database values using a backend PDF generation library. The employee can immediately view this item on their personal dashboard and download it as an official document.

V. CONCLUSION

We have successfully implemented a cloud-enabled, automated Payroll and Workforce Management System tailored for modern corporate and institutional environments. The system replaces error-prone manual tracking with a reliable, digital alternative. By utilizing an AWS EC2 cloud instance paired with an Nginx web server, the application achieves fast load times, robust data isolation, and consistent availability.

Future updates will focus on integrating automated email alerts for generated payslips via Amazon SES, as well as incorporating biometric API hooks to automatically sync real-time physical clock-ins directly to the cloud database.



Add New Employee/User

Username:

Password:

Role:

Weekly Off:

Employee Type:

[Create User](#)

[← Back to Dashboard](#)

Employee List

[Search](#)

#	Employee Name	Username	Action
1	-	ankit-01	View Details
2	-	soham-s	View Details
3	-	test1234	View Details
4	-	Soham	View Details
5	-	aarya	View Details
6	-	test6	View Details
7	-	diksha-01	View Details

Employee: soham-s

[Employee Personal Details](#)
[Employee Attendance Record](#)

Attendance Records

From:

To:

[Filter](#)

DAYS IN PERIOD
0

FULL DAYS
0

HALF DAYS
0

WEEKLY OFF
0

OFFICIAL HOLIDAY
0

TOTAL OVERTIME (HRS)
0.00

EXTRA-DAY COUNT
0

OTHER LEAVES
0

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Employee Panel

- Dashboard
- My Details
- Payroll
- Attendance Records
- Apply Leave
- Logout

Attendance - 19 May 2026

Select IN Time:

Regular IN



Employee Panel

- Dashboard
- My Details
- Payroll
- Attendance Records
- Apply Leave
- Logout

My Personal Details

Full Name:

Gender:

Birth Date:

Mobile:

Aadhar Number:

PAN Number:



Employee Panel

- Dashboard
- My Details
- Payroll
- Attendance Records
- Apply Leave
- Logout

Apply for Leave

Leave Date:

Leave Type:

Leave Reason (Optional):

Submit Leave Request

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